

**REMARKS/ARGUMENTS**

All of the independent claims presented for consideration now contain the limitation that the centralizer is heat shrink mounted or similar wording and in gripping engagement with the upset portion of the metallic pipe thereby preventing relative movement between the centralizer and the upset.

In an earlier Office Action, the Examiner had taken the position that heat shrink fitting is not a structural limitation. Applicant respectfully submits that the Examiner is incorrect. "Heat shrink fitted" or "heat shrink mounted" is no less of a structural limitation than a limitation such as "bolted to," "welded on," or any other numerous such limitations, the purpose of which is to describe and therefore limit the type of connection between two members. Furthermore, "shrink fit" is a recognized design engineering term as shown by the attached webpage from [www.Answers.com](http://www.Answers.com) where "shrink fit" is defined as:

"A fit that has considerable negative allowance so that the diameter of a hole is less than the diameter of a shaft that is to pass through the hole, also called a heavy force fit. Shrink fits are used for permanent assembly of steel external members, as on locomotive wheels. The difference between a shrink fit and a force fit is in method of assembly. In shrink fits, the outer member is heated, or the inner part is cooled, or both, as required. The parts are then assembled and returned to the same temperature."

It simply makes no sense to take the position that a recognized engineering term is not a structural limitation. Surely the Examiner would not contend that a limitation such as “slidingly mounted” or “rotatably journaled” is not a structural limitation.

Furthermore, as pointed out in the application on page 15, lines 17 *et seq* the use of heat shrink construction has many advantages, not the least of which is that it is far less expensive than machining and is just as strong. It would not be economically feasible to machine the centralizer and the keel joint out of a single piece of material. As the cited lines also point out, for stress design purposes with a shrink fitted connection, it is much easier to predict exactly where the stresses will be applied because the relative location of the centralizer 26 and the upset 30 is more exactly defined than in the case where the centralizer would be bolted on because there is essentially no movement whatsoever. Lastly it is pointed out that by shrink fitting even slight movements that may be permitted by other mounted methods such as bolting or reduced or eliminated thereby preventing a much more exact stress analysis and resulting in improved, more efficient, more reliable, and less expensive design construction.

All of the above is by way of pointing out that the use of terminology such as “heat shrink mounted” or similar terminology cannot be ignored as a limitation and must be afforded the same weight as other limitation noted above in assessing the patentability *vel non* of the claimed invention.

In the advisory action, the Examiner contends that in Halkyard ‘205 the centralizer 74 in the upset portion 72 are not prevented from relative movement because the threads grippingly engage the centralizer with the upset portion and therefore are capable of preventing relative movement between the centralizer and the upset portion.

The Examiner further states that while the centralizer and upset portion may be disengaged by force having a magnitude sufficient to overcome the engagement that the same is true for any gripping engagement including that claimed by Applicant. With all due respect, the Examiner is exulting form over substance. No one would confuse a “permanent assembly” (see definition from [www.Answers.com](http://www.Answers.com) re: shrink fit) with a threaded connection. A permanent connection is designed to be just that, a connection in which no movement between the connected parts can occur. A threaded connection on the other hand is a connection not only in which relative movement between the connected parts can occur but in fact is designed to occur. The Examiner’s apparent position that any two connected parts, regardless of the type of connection can be moved relative to one another if a sufficient force is applied is specious. Using that argument, even a monolithic piece of bar stock can be pulled apart if sufficient forces are applied. The Examiner’s position vis-à-vis a centralizer 74 and the upset portion 72 of Halkyard, is simply untenable.

Turning to the Finn et al. reference, all of the claims now recite that the metallic pipe and the metallic upset portion formed on the pipe, are a monolithic structure. Nothing like that is shown in Finn. The Examiner in an earlier Office Action has taken the position that the cross hatching establishes that the Finn centralizer is of solid metal construction. Applicant respectfully submits that the drawings in Finn are in error as exemplified by the express teachings in the Finn patent. To begin with, in column 10, lines 39 *et seq*, it is stated that:

“Shaft 86 is made up of a pair of tapered pipe sections 90  
having flanges 92 on one end. Flanges 92 are joined  
together end-to-end.”

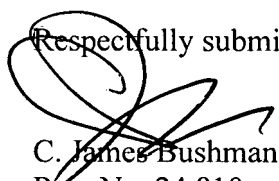
To drive this point home, and as seen in Fig. 9, a nut and bolt assembly (not numbered) is shown obviously for connecting the two flanges 92. Thus, Applicant submits that the drawings that show the centralizer 92 as being monolithic or solid are simply in error, a fact which is supported by the express wording of the Finn specification. To further emphasize this, in column 11, lines 14 *et seq.*, it is stated:

“However, keel joint 106 has a more compact sleeve 108  
that fits closely around flanges 92 of pipe sections 90.”

Note “flanges” and “sections” are both recited in the plural form. The cited lines clearly demonstrate that the pipe sections 90 each have a flange connected by bolts (not numbered) but shown in Fig. 9 and the flanges do not form a monolithic structure.

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims are in condition for allowance which is hereby earnestly solicited and respectfully requested.

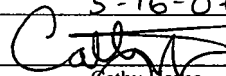
Respectfully submitted,

  
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Cathy Hayes

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## Shrink fit



Sci-Tech Dictionary

**Professional**

shrink fit ('shrɪŋk 'fɪt)

(*design engineering*) A tight interference fit between mating parts made by shrinking-on, that is, by heating the outer member to expand the bore for easy assembly and then cooling so that the outer member contracts.

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Sci-Tech Encyclopedia

**Professional**

Shrink fit

A fit that has considerable negative allowance so that the diameter of a hole is less than the diameter of a shaft that is to pass through the hole, also called a heavy force fit. Shrink fits are used for permanent assembly of steel external members, as on locomotive wheels. The difference between a shrink fit and a force fit is in method of assembly. In shrink fits, the outer member is heated, or the inner part is cooled, or both, as required. The parts are then assembled and returned to the same temperature. *See also* Allowance; Force fit.

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